EUPHONIX BROADCAST

Mixing Audio for HD

With new HD standards currently being adopted by stations throughout the world, the audience demands higher quality audio and, in many cases, surround sound. Audio operators also have to handle increasingly complex productions with ease. From news to sports to production, in the studio or on the road, Euphonix has a range of flexible and modular digital audio mixing solutions, from 32 to over 400 channels, that can be tailored to exactly meet any facility's requirements.

Updates for Broadcast

Euphonix System 5 and Max Air digital audio mixing systems have undergone a series of major evolutionary changes over recent years including updated control surfaces, the addition of the new DSP SuperCore with 100% redundancy, and the option of modular converters to allow for a wider variety of I/O options.

Two new options are now available which greatly enhance the consoles operation and interface to the outside world...

NEW Fiber Stagebox Solution

- Up to 56 mic preamps per Stagebox
- Multiple Stageboxes can connect to a Local-Side Interface
- Redundant MADI over fiber and LAN over fiber
- Modular for custom configurations
- Accepts all I/O cards from the Euphonix Modular Converters
- 2nd Stagebox for local analog or AES/EBU PA splits
- Ethernet mic preamp control from System 5-B & Max Air strips

NEW Ross OverDrive Integration

- Audio-follow-video from Ross Synergy Series Production Switchers
- Control of console faders, on/off switches, pan and PFL
- Can be enabled/disabled locally for seamless transition from audio-follow-video to manual operation
- Playlist software allowing for fully automated productions
- Optional software upgrade requires no additional hardware

Two models are available for different applications and budgets. Both use the same DSP SuperCore, router and range of converters and share many of the same features. What sets them apart is the control surface.

System 5-B

The most advanced digital broadcast mixing system available. It is designed for audio professionals who demand the best. With 8 knobs per channel and TFT displays for metering, routing and parameter display, System 5 is built for the ultimate in operational flexibility and visual feedback.

Max Air

A more compact control surface with 4 knobs per channel and a central touch-screen interface making it very easy to learn and use. Max Air is ideal for one operator to handle everything from on-air news to production and outside broadcasts.

System Architecture

Sources & Destinations

The total number of sources & destinations available increases with each SP662 DSP SuperCore card added to the system. Each card includes 4 MADI (256) inputs and outputs. A typical 3 card system with 12 MADI inputs and outputs, each MADI stream capable of up to 64 channels of digital audio, will have 768 sources and destinations.

Channels

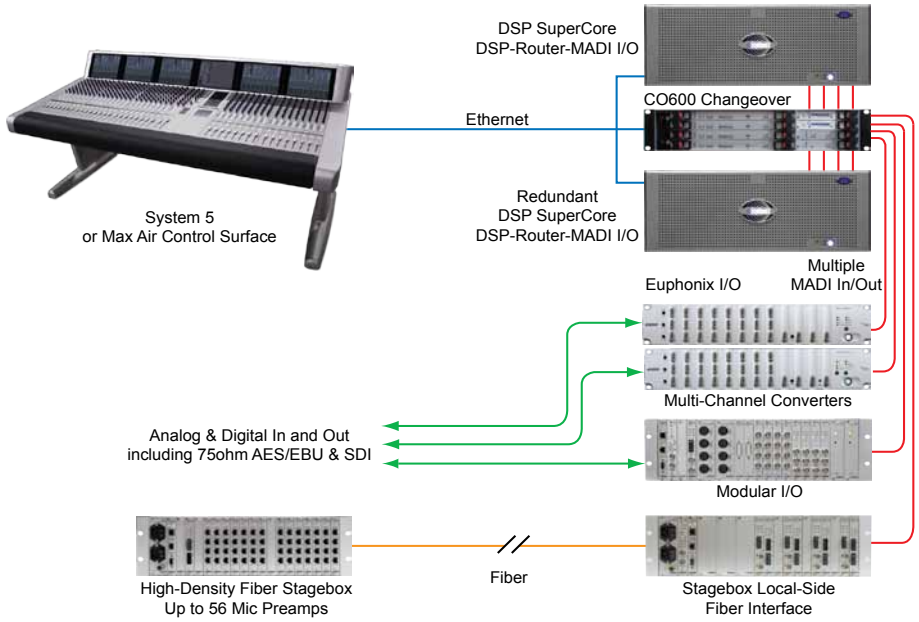
Sources are routed to the console's channels using PatchNet software. From 32 to over 400 channels are available depending on number of SP662 DSP SuperCore cards.

Each channel has:

- 2 inputs, that may be fed from analog or digital sources. Either A, B or A + B may be selected to feed the channel.
- Phase reverse
- Digital gain trim
- Delay - 2 seconds per channel
- Insert send & return
- 4 band fully parametric EQ & 2 filters
- Full dynamics including compressor and expand-gate, key input and side chain filter
- Touch sensitive moving fader
- Multi-format panning to mix & group buses
- Multi-format mix and group buses
- Mono/stereo group/clean feed buses
- Aux/IFB send buses
- Solo (APL, PFL, SIP)
- 2 direct outputs - pre-fader & post-fader
- N-1 mix-minus output from each channel

With Euphonix remote mic pre's connected these controls are available:

- Input impedance - hi/lo
- Phantom power
- High pass filter
- Analog input gain



Buses

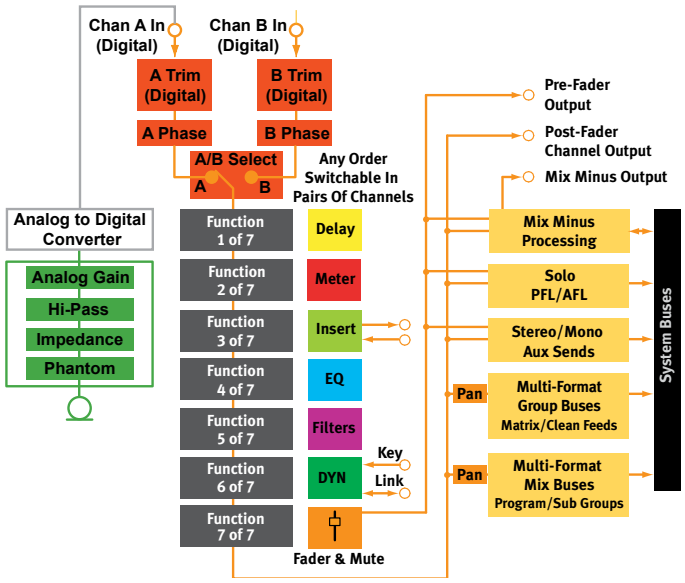
The number of buses available depends on the number of SP662 DSP SuperCore cards and the Mixer Model (software defined mixer configuration).

Three types of buses are available:

- Up to 48 for Multi-Format Mix Buses
- Up to 48 for Multi-Format Group Buses
- Up to 24 for Mono/Stereo Aux Sends

Mix & Group buses can easily be formatted in stereo or surround (up to 7.1 including LCRS and 5.1). Audio sub-groups may be built when needed from available buses. Filters & Dynamics bus processing is available.

Buses may be placed on any channel strip for full control of master level and processing using the 8 knobs and screen displays.



System 5-B Control Surface

Much like any audio console the System 5-B's surface includes channel strips and a center section for master facilities. There are 5 different module types to choose from:

- CM401T Master (1ft wide, 305mm)*
- CM402T Sub-Master (1ft wide, 305mm)*
- CM408T 8-Fader Strips (1ft wide, 305mm)*
- CM409 Blank Module (1ft wide, 305mm)
- CM411v Video Module (1ft wide, 305mm)*

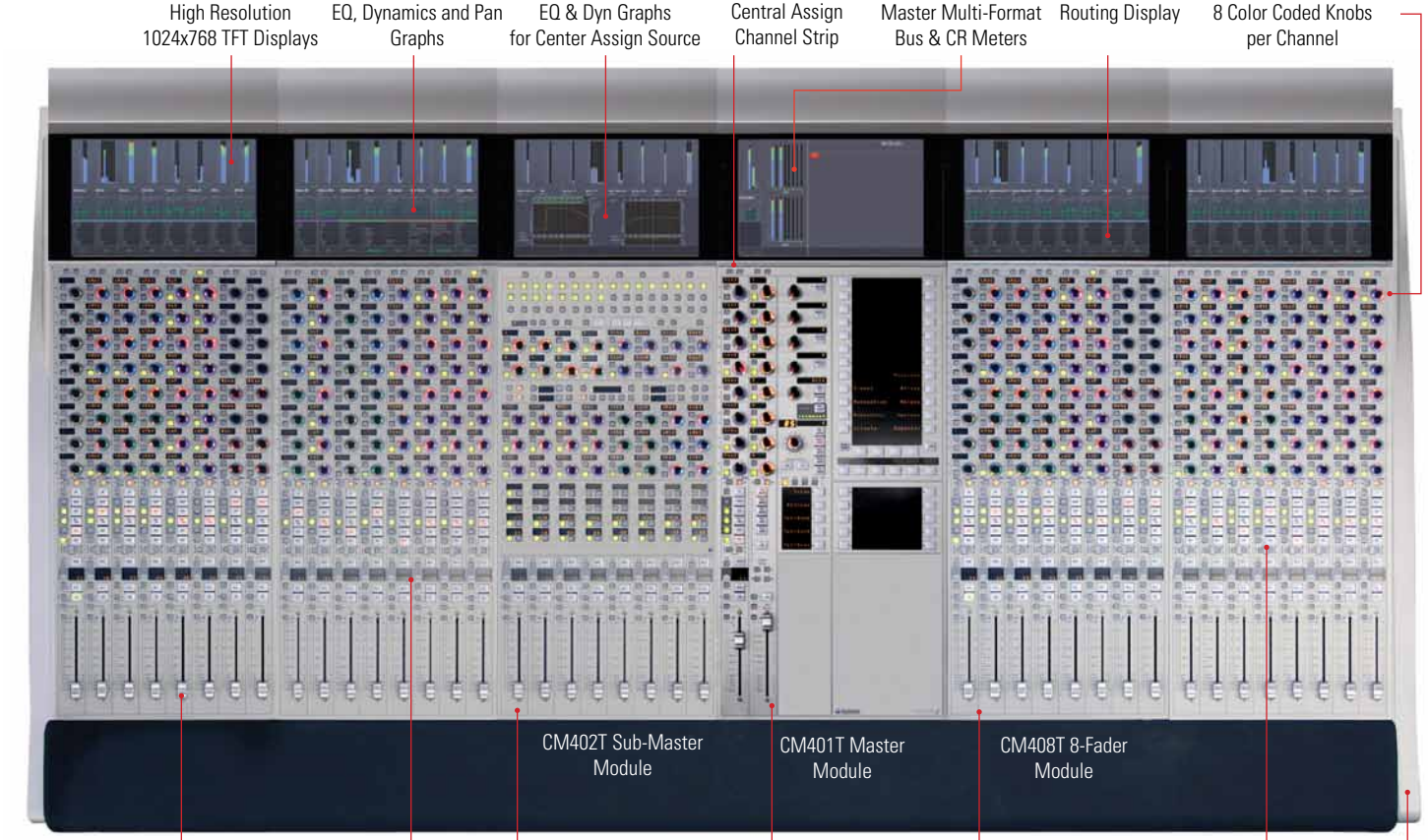
* Includes TFT screen display 1024x768

System 5 can be supplied without a frame for custom installs. Each module is self-contained with dual redundant power supplies and an Ethernet connection for control. Modules may be placed in any order and can easily be moved. If a fader module fails, there is no loss of audio, and it is easy to use other modules to control those sources.

Metering

Every channel includes high-resolution multi-format metering on the TFT screen for display of sources, channels, auxes and groups as well as gain reduction. There is also stereo hi-resolution LED metering next to each fader. The sub-master module offers 8 extra programmable meter displays and the master module has multi-format metering of the main buses and monitors. Meter displays may be customized and saved as presets.

Modular Frame Sizes (Custom Available)			
Frame	Height	Width	Depth
6 modules	39.5" (1 m)	6'10" (2.08m)	41" (1.04m)
9 modules	39.5" (1 m)	9'10" (3m)	41" (1.04m)
12 modules	39.5" (1 m)	12'10" (3.9m)	41" (1.04m)


High Resolution 1024x768 TFT Displays
EQ, Dynamics and Pan Graphs
EQ & Dyn Graphs for Center Assign Source
Central Assign Channel Strip
Master Multi-Format Bus & CR Meters
Routing Display
8 Color Coded Knobs per Channel
CM402T Sub-Master Module
CM401T Master Module
CM408T 8-Fader Module
100mm Moving Faders with high-resolution stereo LED fader meters
Twin Source Designation Display - SWAP function allows individual or global swap to a 2nd layer
CM402T Sub-Master with full channel strip controls for a single source plus 8 faders usually assigned to groups
CM401T Master Assignable Channel Strip, Monitors, Comms, Bus Masters, Main Menu Panel
CM408T 8-Fader Each strip has a fader, 8 knobs & knob function switches plus high resolution TFT screen
Fast Access Buttons for Input, EQ, Dynamics, Filters, Aux, Buses and Pan
Modular frame available in several sizes

Channel Strip CM408T

TFT Screen Display:

High Resolution
Multi-Format Metering up to 7.1

Router Source Name
Source Info
EQ & Pan Curves

Routing Indicators
Knobset Function

Touch Sensitive Knobset:
8 knobs each with
LED color coded outer rings,
4 character displays,
and two switches
for process on/off

Knobset Function Select:
selects the 8 knobs to control
Input, Dyn, Eq, Filters, Aux,
Pan or Routing

Swap the Strip between the
Main and secondary Swap Source

Fader: twin 4 character
designations - may be linked to the
facility router, Talkback, Solo, Chan On,
Chan Select key for bringing source
to the center of the console, 100mm
long-throw, touch-sensitive, motorized
fader, twin hi-res LED meters

Master Module CM401T

Includes a full assignable channel strip, 8 knobs for Bus Masters, plus Monitoring and Comms controls. The Main Panel menu is used for setup and recall of Layouts & SnapShots, Channel Assign, Meters and Strip Setup.

Main Panel Menu System
24 buttons each with 10 character display

Central
Assign Strip

A,B,C & D SLS
Monitors

Solo

CR Monitors

Bus Masters

Bus Master Select

Comms Panel
Sub-Panel

Automation & Transport
Controls for the System
5-BP ONLY
This panel is blank for
System 5-B

Sub-Master Module CM402T

The optional sub-master central assign module adds a complete set of channel strip controls including dedicated knobs for EQ, Filters, Dynamics and Aux Sends plus 48 dedicated Routing Buttons. There is also a section of 32 buttons and displays for selecting any source to the center as well as 8 faders that can be assigned to any source or group. The high-resolution screen adds a further 8 programmable meter group displays as well as large EQ and dynamics graphs.

eMix

eMix is the application that integrates with System 5 and provides setup, file management and the PatchNet patchbay application. It supports the following features accessed from an external screen:

- Directory & File Management
- PatchNet
- System Diagnostics and Mixer Models
- Mix & Group Bus Setup
- Monitor Fold Down & External Inputs Setup
- Events & GPI System Programming

eMix External Screen Mix Bus Setup

Title
Timecode Reader
Bus number

Designations for Mix
Sections

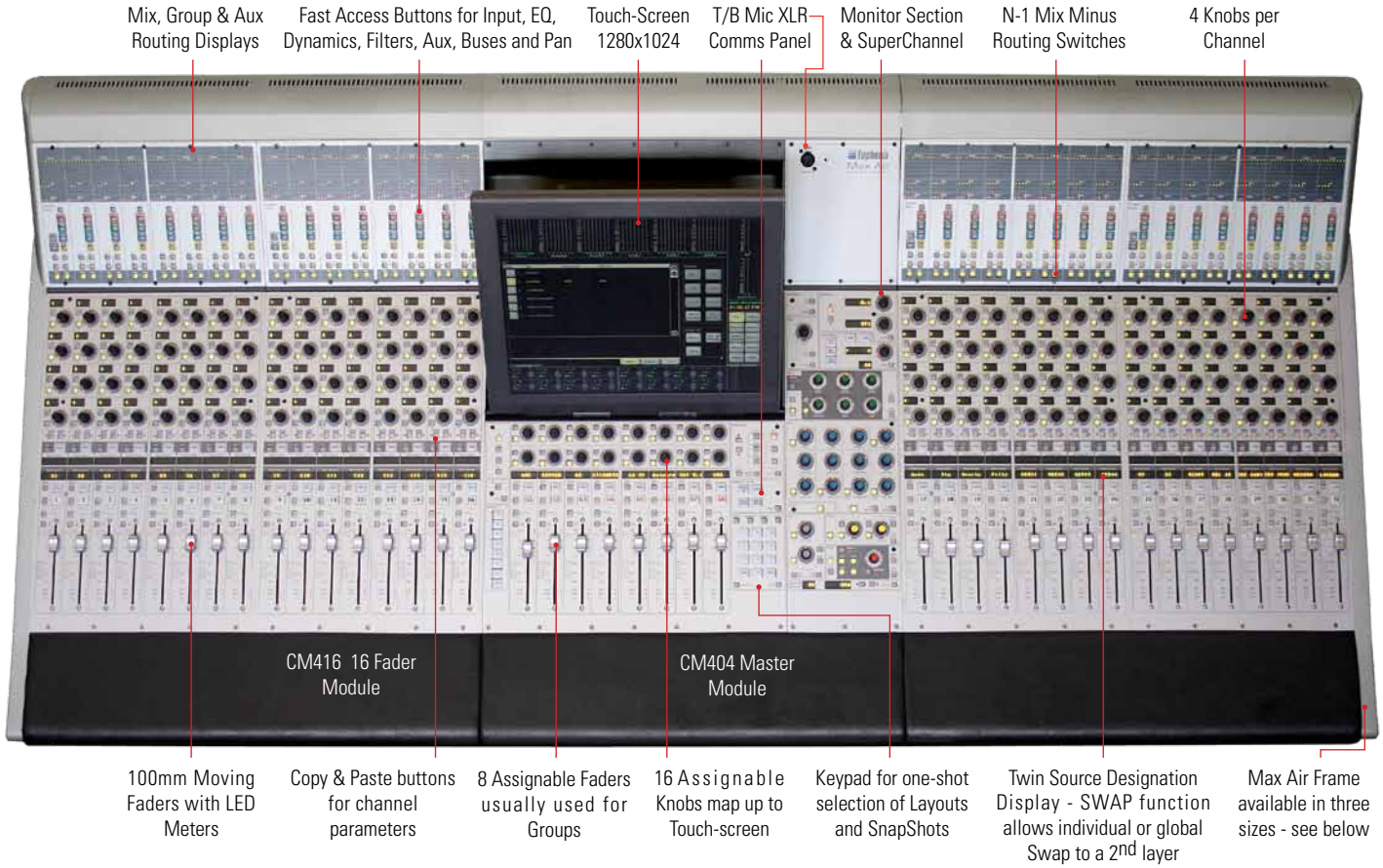
Pan Law Palette for
setting format
of selected buses

Tabs to Group Buses
eMix Pages

Max Air Control Surface

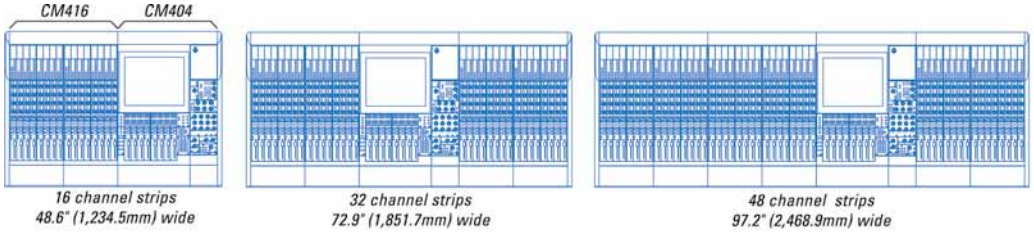
Max Air has been designed to be easy to learn and fast to operate with controls and displays following traditional conventions and layout. The innovative central touch-screen simplifies many of the master functions such as patching.

Each channel strip has 4 knobs that can be selected to control input, EQ, filters, dynamics, aux sends as output bus assignments. Custom knobset configurations can be setup to allow the operator to put the most often used controls on the surface at the push of a button. Any source may be brought to the central SuperChannel for access to all controls. Two surface module types are available, with dual power supplies. Connections to the system are CAT5 Ethernet so placement is not restricted by complex cabling. No audio flows through the control surface as the audio electronics are housed remotely. As with System 5, the loss of a fader module does not interrupt audio, control can be switched to other modules.


Mix, Group & Aux Routing Displays
Fast Access Buttons for Input, EQ, Dynamics, Filters, Aux, Buses and Pan
Touch-Screen 1280x1024
T/B Mic XLR Comms Panel
Monitor Section & SuperChannel
N-1 Mix Minus Routing Switches
4 Knobs per Channel
CM416 16 Fader Module
CM404 Master Module
100mm Moving Faders with LED Meters
Copy & Paste buttons for channel parameters
8 Assignable Faders usually used for Groups
16 Assignable Knobs map up to Touch-screen
Keypad for one-shot selection of Layouts and SnapShots
Twin Source Designation Display - SWAP function allows individual or global Swap to a 2nd layer
Max Air Frame available in three sizes - see below

Control Surface Dimensions

Max Air may be supplied with a frame or can be table/custom mounted. CM416 & CM404 Modules width 22.3" (566mm) Modules may be placed in any order - only connections are power and Ethernet. Front-back depth inc. buffer 35.4" (900mm), no buffer 29.6" (751mm)



The Touch-Screen

The touch-screen provides simple graphical access to master functions and setup pages for each area of the console. Mix and Group buses can be configured for any format, plus the reverse interrogation of these assignments is quickly accessed. File functions as well as the PatchNet digital patchbay are also accessed via the touch-screen. The screen can also show all parameters of the centrally assigned channel. Backup SXVGA and keyboard/mouse are available.

Channel Strip CM416

The Max Air channel strip can be swapped individually or globally between two sources - useful for backup source selection. All controls are clearly labelled and operation is straightforward and fast.

Routing Display:
Group, Aux and Mix Sections

Knobset Function Select:
selects the 4 knobs to control input, Dyn, Eq, Filters, Aux, Pan or Bus Routing

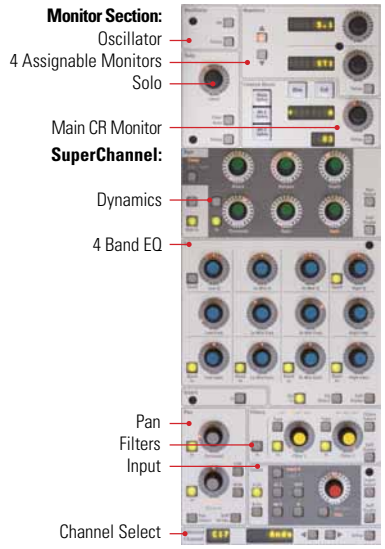
Knobset:
4 knobs with 4 character displays & switches

Swaps the Strip between the Main and secondary Swap Source, Talkback button

Fader:
twin 8 character designations (that may be linked to the facility router), Solo, Channel On, Channel Select, 100mm touch motorized fader, twin LED meters

SuperChannel

To the right of the touch-screen in the center of the console is the SuperChannel. Any source can be quickly assigned to this area which includes full controls for all parameters in the channel.



Metering

Every channel includes level and gain reduction metering next to the fader. The touch-screen can be programmed to show any combination of metering at the top including main program. An optional external metering package can be fitted offering 28 meter groups that can be custom arranged on an external monitor.

Touch-Screen

DF66 DSP SuperCore with MADI I/O & Router

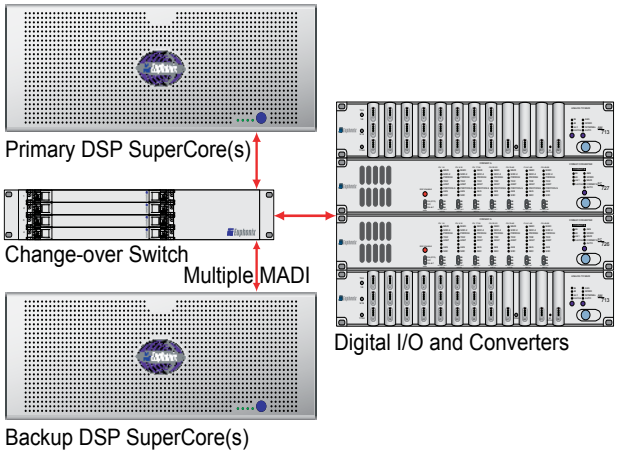
The new lightweight and compact DF66 DSP SuperCore is the signal-processing engine and router for System 5 and Max Air digital mixing consoles. A broadcast system is comprised of two DF-66 SuperCores, each with up to six plug-in SP662 DSP cards, and a CO660 changeover switch for 100% secure redundant operation. The new SuperCore has more than enough DSP horsepower, system functionality, and reliability to satisfy today's demanding broadcast applications.

DF66 DSP SuperCore

Up to 6 SP662 DSP Cards

The DSP SuperCore Provides:

- **DSP Processing** - Massive amount of scalable DSP available for fully featured channels and buses with Delay, EQ & Dynamics processing. Each SP662 card adds 4.8 GFLOPS of processing power.
- **MADI I/O** - each SP662 card adds 4 MADI inputs and outputs (256x256 paths at 48 kHz)
- **Built-In Broadcast Router** - Patches are made and recalled via the console's PatchNet software
- **100% Changeover Option** for complete immediate changeover of the DSP SuperCore including DSP Channels, MADI I/O, and Router



DSP SuperCore Features

The DSP SuperCore is packed with advanced features that stand out from the competition:

- Compact, lightweight, modular and scalable
- Accommodates from 32 up to 400 channels of audio with full EQ & dynamics at 48 kHz
- Independent EQ and dynamics processing plus up to 2 seconds delay for each channel
- Bus processing with dynamics and filters
- 4,096-path FPGA audio router on each SP662 DSP card
- Up to 24x24 MADI I/O (1536 x1536 paths @ 48 kHz) per DSP SuperCore
- DSPs support 40 bit, 32 bit IEEE floating point and 32 bit fixed point formats
- Hybrid FPGA and DSP technology to accommodate 40 bit floating point (extended precision) operation, for timing precision, and wide feature set
- Parallel signal processing utilizing SIMD (Single Instruction Multiple Data) architecture
- Dual redundant power supplies
- Optional SNMP System Management Controller remotely monitors operating conditions and notifies the user to take action to avert system failure

100% Secure Changeover

CO660 Changeover Unit

For broadcast installations Euphonix supplies a backup DSP SuperCore in parallel with the primary unit and is the only total redundancy system available on the market - another Euphonix first. **This ensures complete redundancy of the MADI I/O, Router and DSP Processing!**

All audio signals are distributed to both the primary and backup DSP cores. If the diagnostics system detects a fault the operator is notified and given the option to changeover the system. Linked DSP SuperCores in the primary and backup systems work as one contiguous DSP core. The changeover function switches all I/O over to the backup system.

SNMP System Management

The DF66 can be fitted with an optional SNMP System Management Controller which remotely monitors a variety of internal system conditions and notifies the user to take action to avert system failure via email, pager or the web. Battery backup ensures operation even when power fails.

Converters & I/O

Modular I/O System

The new range of modular converters is based around a 3RU 19" chassis conforming to the DIN 41494 specification with dual power supplies. Cards may be fitted in slots at the front and the rear for high density configurations. 16 different cards are available offering many different I/O combinations including:

- MADI Interface Module (Coax or Fiber)
- MADI Interface Module - Fiber with Redundancy
- 16ch HD De-embedder
- 8 Ch SDI De/Embedder Module
- 8 Ch HD/SD SDI De/Embedder

Modular I/O Rack

- 4 Ch AES/EBU Input/Output Module
- 8 Ch AES/EBU Input Module
- 8 Ch AES/EBU Output Module
- 4 Ch Analog Line Input Module
- 4 Ch Analog Line Output Module
- 4 Ch Microphone Input Module (2-units wide)
- 4 Ch High-Density Microphone Input Module (1-unit wide)
- Dolby D+ Encoder
- Dolby D/E Decoder
- Dolby E Encoder
- Ethernet Remote Control Module for Mic Pre Control
- Sync Module
- Power Module

High-Density Fiber Stagebox Solution

The new Fiber Solution features multiple high-density stage boxes connecting into the Euphonix DSP SuperCore via redundant MADI-over-fiber, with redundant LAN-over-fiber control directly from the console's channel strips. Each modular 3U Stage Box can handle up to 56 mic preamps and can be fitted with combinations of the modular I/O shown above to match the exact requirements of a particular application. A second stage box could also be fitted to provide analog or digital splits of the mic preamp outputs from the first stage box for feeding the local PA/monitor mixers, for example.

Stagebox
(56 Mic Preamps & Fiber/LAN modules shown)

Local-Side Interface (4 Stagebox example)
(4 sets of Stagebox Fiber to console MADI shown)

Multi-Channel Converters, Remote Mic Preamplifiers & Fiber MADI Extender

2RU form factor multi-channel converters:

- **AM713** - 26 Analog XLR & 2 AES/EBU to MADI
- **MA703** - MADI to 26 Analog XLR & 2 AES/EBU
- **DM714** - 26 75Ω or 110 Ω AES/EBU to MADI
- **MD704** - MADI to 26 75Ω or 110Ω AES/EBU
- **ML530** - 24 Remote Controlled Mic Preamps
- **FC726** - 56-channel bi-directional Digital Format Converter AES/EBU, MADI, SPDIF-2, ProDigi, TDIF and ADAT Optical

- **FT730 FiberTran Extender**
  Extends MADI and Digital Sync or the Euphonix TCC control for the ML530 mic preamps or the MC524 monitor controller, up to 1km over fiber optic cable.

DM714
MA704

PatchNet

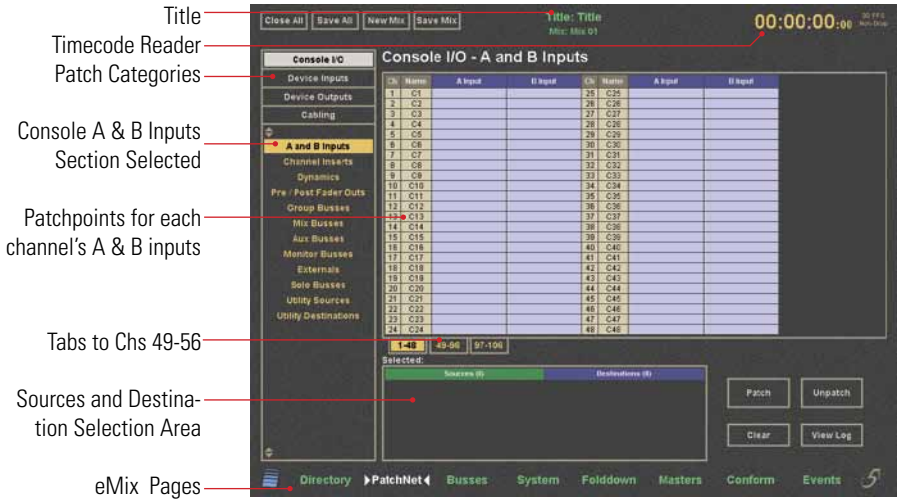
PatchNet Routing

The router in the DSP SuperCore is controlled by the PatchNet application which is simple to use and a very powerful digital audio patching system. PatchNet appears on an external screen with System 5 and on the central touch-screen with Max Air.

Each of the MADI source and destination audio streams in the DSP SuperCore can be labelled, for example **Stage 1 Mics**, and each audio source within a MADI stream may also be individually labelled, for example **Mic 1**. All console inputs and outputs, for example **Channel 1 A Input**, also appear in PatchNet.

PatchNet is faster, easier and more flexible than an analog patchbay. Setups can be saved and recalled for each show, including a basic setup which includes all source and destination designations, as a starting point for new shows.

System 5 PatchNet Screen showing console ins and outs



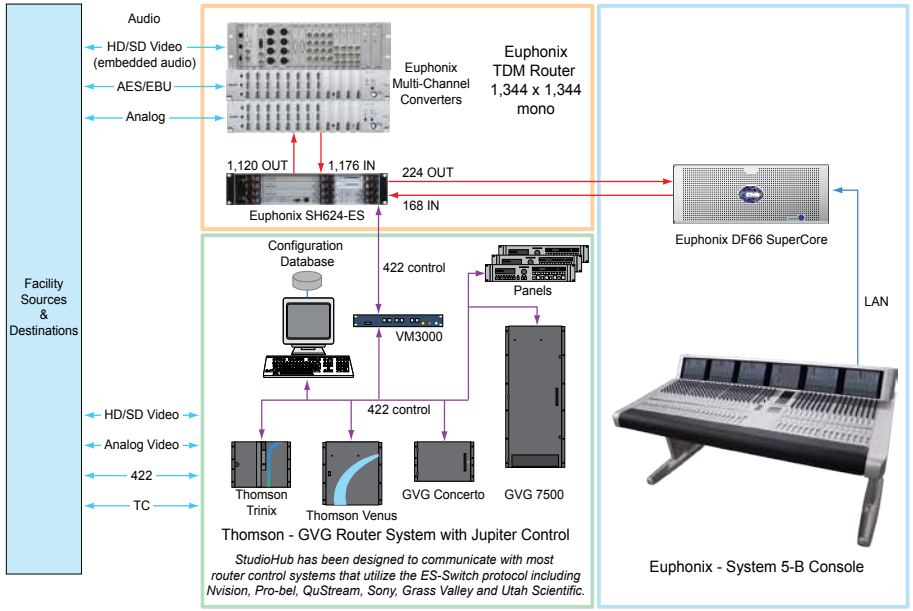
Router Integration

SH624 StudioHub Router

The Euphonix StudioHub, 2RU 24x24 MADI router can be added to the system, taking parallel MADI feeds of all console sources and destinations for distribution throughout the facility. StudioHub has been designed to communicate with most router control systems that utilize the ES-Switch protocol including Harris - Leitch, Nvision, Pro-bel, QuStream, Sony, Thompson-Grass Valley and Utah Scientific.

In some applications, this replaces the traditional house router audio layer while satisfying the demands of redundancy for on-air operation. The integration also simplifies patching, as the audio operator will no longer be required to patch console output buses to the destinations.

Console output buses such as main program, aux feeds, and IFB's automatically appear as sources on the router. Additionally, engineering then has full control of all audio sources from any router control panel, which means no more crowding the audio room during setup and troubleshooting for shows.



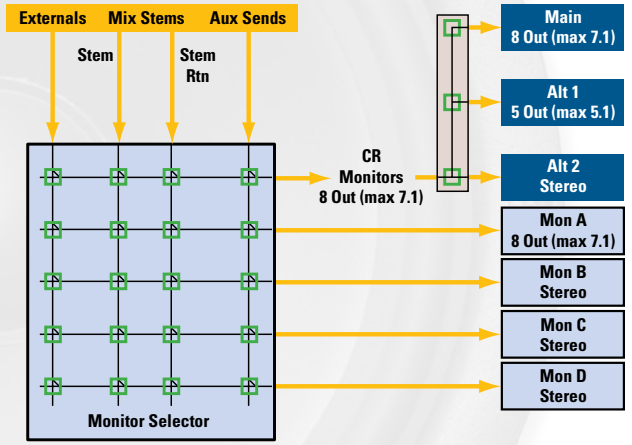
Ross OverDrive

Euphonix now features integration with the Ross OverDrive Production Control System available in their Synergy Series Production Switchers. OverDrive offers centralized control of many studio devices including servers, routers, and robotic cameras, as well as the audio console. The system's RundownControl playlist software allows for fully automated productions.

Euphonix integration is available in all latest release System 5-B, System 5-BP and Max Air consoles. This optional software upgrade requires no additional hardware and enables external control of all channel faders, on/off switches, pans, and PFL. The feature can be enabled or disabled locally on the fly to allow seamless transitions between audio-follow-video functionaity and manual operation. The centralized control offered by OverDrive gives the ability to execute a more consistent, sophisticated production on the air without increasing staffing levels.

Surround Monitoring

Both systems include a professional surround sound monitor matrix, the same surround facility used to dub Academy Award winning feature films. Source selection is made from dedicated controls and is very intuitive to operate as the matrix intelligently switches feeds in their correct format to the appropriate speakers. All formats up to 7.1 are supported. Matrix includes Main CR, Alt 1 & 2, 4 SLS speaker feeds, 32 External Monitor Playback Inputs, Bus outputs and returns, and Aux sends.



Multi-Format Control & Spill

Each strip on the System 5 and Max Air can control a single source, a 5.1 or stereo formated source, or groups such as a 5.1 network feed. These sources may be controlled on a single Multiformat Master fader with underlying EQ and dynamics processing linked to all the 6 elements. A Euphonix invention; the Multiformat Master, or Group may be "SPILLED" onto the surface at the push of a button, which allows the underlying elements to be adjusted separately as needed.

Events System and GPI

Both Max Air and System 5 feature an Event System as standard. The Event System allows the control surface to interface with other equipment in the studio and for audio-follow video. Events can be surface parameters (i.e., channel on, fader position, etc.) or external inputs/outputs via the GP132 (General Purpose Interface). Multiple events may be combined for custom combinations.

N-1 Mix-Minus Bus

Both System 5 and Max Air include a dedicated N-1 mix-minus bus. The Bus button for each strip includes that channel onto the mix-minus bus. A Mix-Minus button phase inverts the signal on the strip, adds it to the mix-minus bus, and routes the resultant N-1 feed to the channel's N-1 dedicated output.

Layouts

The position of sources on the console surface can be saved and recalled as Layouts. The operator can bring critical sources within easy reach and change Layouts at the push of a button between show segments making it easy to manage hundreds of sources on a smaller surface. Layouts take the stress out of mixing complex shows.

SnapShots

Console parameters such as a channel's complete settings or an element like an EQ's parameters may be saved to a SnapShot. This is very useful for saving different versions of an EQ, for example. SnapShots and Layouts may be named, saved and modified. The operator can also select what is to be included in a Layout or SnapShot.

On-Air

There are over 200 installations of Euphonix broadcast consoles throughout the world in many different broadcast applications. Both System 5 and Max Air are each suitable for any type of broadcast audio mixing especially for HD where sound quality and surround are key factors in the choice of console.

Sports
Canal+, Paris

News
Newseum, Washington D.C.

Production
NASA, Houston

Live Venue, Broadcast & Post
Grand Ole Opry, Nashville

OB Truck
CLS Audiovisuais, Lisbon

OB Truck
Mobile TV Group, Denver

Production
Chengdu-TV, Chengdu

Live Venue, Broadcast & Post
Lakewood Church, Houston

System 5-BP Model On-Air & Audio Post Applications

The System 5-BP has the same features as the System 5-B but with the addition of dynamic mix automation – the same automation of faders, knobs and SnapShots that is available on the Euphonix System 5 range of audio post and music mixing consoles. The System 5-BP includes the transport and automation panels at the bottom of the central CM401 Master Module.

Sales & Support

During the sales process our knowledgeable and experienced sales and product specialist staff can work with your installation team to exactly match a system to your requirements and will help integrate the Euphonix console into your facility. Euphonix prides itself on excellent after sales support that is second-to-none. *We will do whatever it takes to get you on-air and keep you on-air.*

System 5 & Max Air DVDs

DVDs are available for both systems which include hands-on training in easy to access chapters plus a guided tour of the system. These video clips are also available online for fast access to operational training questions as they arise.

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